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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/815,955	04/02/2004	Ik-Hyeon Kwon	4518-2	8925
23117 7590 03/18/2008 NIXON & VANDERHYE, PC 901 NORTH GLEBE ROAD, 11TH FLOOR ARLINGTON, VA 22203				
EXAMINER				
MAKI, STEVEN D				
ART UNIT		PAPER NUMBER		
1791				
MAIL DATE		DELIVERY MODE		
03/18/2008		PAPER		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

**Application No.**

10/815,955

**Applicant(s)**

KWON ET AL.

**Examiner**

Steven D. Maki

**Art Unit**

1791

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SF 298)  
Paper No(s)/Mail Date 040204
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_

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- 1) The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

- 2) Claims 1-10 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 1 part (C), there is no antecedent basis for "the crosslinker" and, as such, the scope of claim is uncertain.

In claim 2 line 10, there is no antecedent basis for "the PVA raw cord"

- 3) The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

- 4) The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

- 5) **Claim 2 is rejected under 35 U.S.C. 102(b) as being anticipated by Nielsen et al (US 4,811,917).**

Nielsen et al discloses an apparatus for liquid treatment of yarn comprising perforated tubes (figure 1) on which yarn bobbins 13 are wound, closure cap 14 and distributor pipe 11. The claimed first and second bobbins read on the tubes. The tubes

are stacked on each other as shown in figure 5. This assembly is placed in a bath of liquid which one of ordinary skill in the art is contained in a container. Liquid is pumped from the inside out and from the outside in. One of ordinary skill in the art would readily understand that a pump is used to obtain the desired pumping. The claimed apparatus is anticipated by Nielsen et al's apparatus. The description regarding "crosslinker" and "the PVA raw cord" relates to the product worked upon and fails to require apparatus structure not disclosed by Nielsen et al.

**6) Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Clifford et al (US 6,083,284) in view of Europe 365 (EP 233365) and Nielsen et al (US 4,811,917).**

Clifford et al discloses an apparatus for evenly treating yarn packages with liquid such as dye liquid comprising a vessel 21 (container) for holding the liquid and a stack of loads 17 placed on holders 17. With respect to loads, Clifford et al discloses forming a load (package) by winding a yarn onto a perforated cylindrical core formed as a cylindrical bobbin. The bobbins are mounted on a spindle (the holder 17). Clifford et al teaches apparatus means for circulating the liquid through the packages in both of opposite directions. Clifford et al does not recite the specific construction of the bobbins.

With respect to bobbin structure, it would have been obvious to provide a first bobbin with a protrusion and a second bobbin with a coupling groove since (1) Clifford et al teaches stacking bobbins about which yarn is wound so that plural yarn packages may be treated with liquid and (2) German 365 (figure 5) and Nielson et al (figures 1, 5),

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also directed to liquid treatment of yarn, teach form bobbins with specific end structure so that the bobbins overlap in order to facilitate formation of a stack of yarn packages. As to first bobbin wheel and second bobbin wheel, Nielson et al suggestion associating a first bobbin wheel (closure cap toward top of figure 5) with the first bobbin and a second bobbin wheel (illustrated toward bottom of figure 5) with the second bobbin wheel in order to complete the stack. As to pipeline, each of Clifford et al (holder 17), Europe 365 (dye pipe 1) and Nielsen et al (distributor pipe 11) suggest "attaching" a pipeline to the bobbins so that fluid can be delivered to the packages.

**7) Claims 1 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Iwasaki et al (US 5,016,698) in view of Ise et al (US 6,319,601).**

Iwasaki et al discloses making a PVA fiber cord for a pneumatic tire by spinning polyvinyl alcohol using a dry system, wet system or dry-wet system; passing the yarn through a solidification bath of methanol or the like; drawing and further drawing the yarn under heat treatment; twisting the yarn to obtain a "cabling yarn" having a twisting number such as 31X31; plying the "cabling yarn" to produce a raw cord" such as a 2-ply "raw cord" having a denier (D) of 1500/2; **immersing the polyvinyl alcohol "raw cord" in a bath comprising crosslinking agent (e.g. aldehyde) and a solvent such as water or methyl alcohol (methanol);** washing out extra crosslinking agent remaining between the cords or on the surface of the filament with water, alcohol or the like; then subjecting the polyvinyl alcohol fiber cord treated with the crosslinking agent to drying a heat treatment to cross link the crosslinking agent; then **immersing the crosslinked cord in a resorcin/formaldehyde/latex (RFL) series adhesive;** drying and subjecting

the RFL treated cord to heat treatment. Iwasaki et al teaches that the crosslinking agent causes crosslinking reaction between OH groups or adjoining polyvinyl alcohol molecules to improve fatigue properties and resistances to compression, distortion, high temperature and hot water in the filament. Iwasaki et al teaches using a crosslinking agent such as aldehydes. See Table 1, col. 3 lines 18-22, col. 4 lines 55-68, col. 5 lines 1-29, col. 5 lines 41-46 and col. 5 lines 64-68. As an alternative to immersing the cord in a bath comprising crosslinking agent and solvent as described at col. 5 lines 4-29, Iwasaki et al teaches that the penetration of crosslinking agent can be carried out at a spinning step or a solidification step (col. 5 lines 30-55). Hence, Iwasaki et al substantially teaches the claimed cord, but is silent as to degree of polymerization.

As to claim 1, it would have been obvious to one of ordinary skill in the art to provide the polyvinyl alcohol for spinning with a degree of polymerization of 1000-7000 since Ise et al, also directed to polyvinyl alcohol fiber cords for tires, teaches that the mean degree of polymerization should be 1000-5000 in view of spinnability, drawability, elongation at break, mechanical properties and cost (column 5).

As to claim 9, Iwasaki et al teaches treating the cord with RFL. The claimed properties would have been obvious in view of the properties disclosed by Iwasaki et al in Table 1 and Table 2.

**8) Claims 1-7 and 9-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Iwasaki et al (US 5,016,698) in view of Ise et al (US 6,319,601) and further in view of Kurashige (US 3,345,446), Matsubayashi et al (US 3,007,228)**

**and Japan 609 (JP 05-163609) and optionally further in view of Clifford et al (US 6,083,284), Europe 365 (EP 233365) and Nielsen et al (US 4,811,917).**

Iwasaki et al discloses making a PVA fiber cord for a pneumatic tire by spinning polyvinyl alcohol using a dry system, wet system or dry-wet system; passing the yarn through a solidification bath of methanol or the like; drawing and further drawing the yarn under heat treatment; twisting the yarn to obtain a "cabling yarn" having a twisting number such as 31X31; plying the "cabling yarn" to produce a raw cord" such as a 2-ply "raw cord" having a denier (D) of 1500/2; **immersing the polyvinyl alcohol "raw cord" in a bath comprising crosslinking agent (e.g. aldehyde) and a solvent such as water or methyl alcohol (methanol);** washing out extra crosslinking agent remaining between the cords or on the surface of the filament with water, alcohol or the like; then subjecting the polyvinyl alcohol fiber cord treated with the crosslinking agent to drying a heat treatment to cross link the crosslinking agent; then **immersing the crosslinked cord in a resorcin/formaldehyde/latex (RFL) series adhesive;** drying and subjecting the RFL treated cord to heat treatment. Iwasaki et al teaches that the crosslinking agent causes crosslinking reaction between OH groups or adjoining polyvinyl alcohol molecules to improve fatigue properties and resistances to compression, distortion, high temperature and hot water in the filament. Iwasaki et al teaches using a crosslinking agent such as aldehydes. See Table 1, col. 3 lines 18-22, col. col. 4 lines 55-68, col. 5 lines 1-29, col. 5 lines 41-46 and col. 5 lines 64-68. As an alternative to immersing the cord in a bath comprising crosslinking agent and solvent as described at col. 5 lines 4-29, Iwasaki et al teaches that the penetration of crosslinking agent can be carried out at

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a spinning step or a solidification step (col. 5 lines 30-55). Hence, Iwasaki et al substantially teaches the claimed cord, but is silent as to degree of polymerization.

As to claim 1, it would have been obvious to one of ordinary skill in the art to provide the polyvinyl alcohol for spinning with a degree of polymerization of 1000-7000 since Ise et al, also directed to polyvinyl alcohol fiber cords for tires, teaches that the mean degree of polymerization should be 1000-5000 in view of spinnability, drawability, elongation at break, mechanical properties and cost (column 5).

As to claims 1-10, it would have been obvious to one of ordinary skill in the art to crosslink Iwasaki et al's polyvinyl alcohol cord using a crosslinker comprising aromatic aldehyde and acid catalyst while adding alcohol since (1) Iwasaki et al teaches crosslinking the polyvinyl alcohol cord using a crosslinker such as aldehyde and (2) it is well known in the art of polyvinyl alcohol fibers to crosslink (acetalize) polyvinyl alcohol fibers using a liquid bath of aromatic aldehyde and acid catalyst as evidenced by Kurashige, Matsubayashi et al and Japan 609 (paragraph 17 of machine translation). Kurashige teaches that hot water resistance, which is desired by Iwasaki(col. 4 lines 55-68), is improved. Kurashige also teaches including methanol in the bath. As to claims 4 and 5, the secondary art (e.g. Kurashige) teaches using methanol in the bath. As to claim 6, the secondary art (e.g. Kurashige) teaches using a small percentage (e.g. 2%) of the aromatic aldehyde. As to the specific type of aldehyde (claim 7), see col. 3 line 45 of Matsubayashi et al and paragraph 23 of machine translation of Japan 609. As to claim 8, Japan 609 teaches using an organic acid as a catalyst and acetic acid is taken as a well known organic acid per se. As to properties (claims 9 and 10), Iwasaki et al



teaches treating the cord with RFL and the claimed properties would have been obvious in view of (1) the properties disclosed by Iwasaki et al in Table 1 and Table 2 and (2) the suggestion from the applied secondary art to improve hot water resistance of PVA fibers by crosslinking with aromatic aldehyde and acid catalyst.

As to claim 3, the product by process language including the use of the apparatus of claim 2 fails to define a materially different product. In any event: As to claims 2-8 and 10, it would have been obvious to one of ordinary skill in the art to treat the PVA cord with the liquid crosslinker using a container, first bobbin and second bobbin as claimed since Clifford et al suggests evenly treating yarn packages with liquid such as dye liquid using an apparatus comprising a vessel 21 (container) for holding the liquid and a stack of loads 17 placed on holders 17. With respect to loads, Clifford et al discloses forming a load (package) by winding a yarn onto a perforated cylindrical core formed as a cylindrical bobbin. The bobbins are mounted on a spindle (the holder 17). Clifford et al teaches apparatus means for circulating the liquid through the packages in both of opposite directions. With respect to bobbin structure, it would have been obvious to provide a first bobbin with a protrusion and a second bobbin with a coupling groove since (1) Clifford et al teaches stacking bobbins about which yarn is wound so that plural yarn packages may be treated with liquid and (2) German 365 (figure 5) and Nielson et al (figures 1, 5), also directed to liquid treatment of yarn, teach form bobbins with specific end structure so that the bobbins overlap in order to facilitate formation of a stack of yarn packages. As to first bobbin wheel and second bobbin wheel, Nielson et al suggestion associating a first bobbin wheel (closure cap toward top of figure 5) with

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the first bobbin and a second bobbin wheel (illustrated toward bottom of figure 5) with the second bobbin wheel in order to complete the stack. As to pipeline, each of Clifford et al (holder 17), Europe 365 (dye pipe 1) and Nielsen et al (distributor pipe 11) suggest "attaching" a pipeline to the bobbins so that fluid can be delivered to the packages..

9) **Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Iwasaki et al in view of Ise et al and further in view of Kurashige, Matsubayashi et al and Japan 609 and optionally further in view of Clifford et al, Europe 365 and Nielsen et al as applied above and further in view of Matson et al (US 6911219).**

As to claim 8, it would have been obvious to one of ordinary skill in the art to use "acetic acid" as the catalyst for the crosslinker since Matson et al teaches that it is known per se that acetic acid may be used as a catalyst for acetalization reaction for polyvinyl alcohol.

#### Remarks

- 10) The remaining references are of interest.
- 11) No claim is allowed.
- 12) Any inquiry concerning this communication or earlier communications from the examiner should be directed to Steven D. Maki whose telephone number is (571) 272-1221. The examiner can normally be reached on Mon. - Fri. 8:30 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Crispino can be reached on (571) 272-1226. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Steven D. Maki/  
Primary Examiner, Art Unit 1791

Steven D. Maki  
March 17, 2008